

Flat manifolds and reducibility

Andrzej Derdzinski¹.

¹ The Ohio State University

In 1991 Hiss and Szczepański proved that the holonomy group of a compact flat Riemannian manifold, of dimension at least two, must act reducibly on the rational span of the Euclidean lattice associated with the manifold via the first Bieberbach theorem. Geometrically, their theorem states that such a manifold admits a nonzero proper parallel distribution with compact leaves. We study algebraic and geometric properties of the resulting holonomy-invariant rational subspaces, and of the compact-leaf foliations of compact flat manifolds corresponding to them. The class consisting of the former subspaces, in addition to being closed under spans and intersections, also turns out to admit (generally nonorthogonal) complements. As for the latter foliations, we provide descriptions of the intrinsic geometry of their generic leaves (in terms of that of the original flat manifold) and of the leaf-space orbifold.

This is joint work with Paolo Piccione.